IMPERIAL REFINING COMPANY
Ardmore, Carter County, Oklahoma

EPA Region 6
EPA ID# OK0002024099
Site ID: 0605091
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State Congressional District: 4
Fact Sheet Updated: September 2012
Next Scheduled Update: October 2012

Background

The Imperial Refining Company is located on Highway 142, Ardmore, Carter County, Oklahoma. Imperial Refining was an inactive and abandoned crude oil refining facility that operated from 1917 until 1934 when it declared bankruptcy. Waste piles were found onsite and were characterized as dry, asphalt-like tar mats associated with oil-contaminated soil on top of oil-stained clay.

The contaminants of concern are PAHs (polynuclear aromatic hydrocarbons) and metals, primarily Benzo(a)pyrene and arsenic.

An estimated 130 residents live within 200 feet of the facility and an estimated 23,427 individuals live within four miles of the facility. There is no school or daycare center located within 200 feet of the facility.

During remedial action, a total of approximately 104,493.5 yd^3 of waste/soil and approximately 1699.5 yd^3 of sediment were removed from the Site and shipped to an offsite landfill. In addition, for those areas where waste remains in place, a clay barrier was constructed to mitigate migration and exposure.

Current Status

The Record of Decision was finalized on December 26, 2007, followed by a Record of Decision Amendment signed on February 20, 2009. The selected remedy included excavation and offsite disposal of contaminated waste, sediment and soil, and containment for areas where waste remains in place. EPA and Oklahoma Department of Environmental Quality (ODEQ) are conducting routine site maintenance.

The site is monitored routinely for areas of erosion and lack of vegetative growth. Actions that have been implemented include seeding, fertilization, silt fencing, area grading, wood mulching, rip-rap placement, and water discharge management control.

EPA and ODEQ conducted further evaluation and analysis of an areas requiring continual maintenance and erosion control. The objective of this evaluation was to identify a solution that would resolve the erosion problem. Activity planning began in February 2010, and site field work began during the week of June 7, 2010, with the topographic survey. The report was submitted in December 2010. Based on information provided in the December 2010 report and comments provided during review, the draft

Design of the selected alternative was submitted in April 2011. A team meeting was held at the site on July 14, 2011, between EPA, ODEQ, the Oklahoma Department of Transportation, the City of Ardmore, and the Chickasaw Telephone Company to discuss the design in the field and provide additional comment and clarification. The August 19, 2011, Final Erosion Mitigation Design Document was accepted as final by the EPA on August 26, 2011, after receipt of support letters from all reviewing parties. Contracting activities were completed, and the field work began November 28, 2011. Field work related to channel construction, erosion mitigation, and surface water drainage was completed in February 2012. These elements will be inspected throughout the year to monitor and assess continued functionality.

The ODEQ has completed and filed all of the necessary institutional controls restricting site reuse to industrial. Site operational and functional activities will be conducted by EPA until the ODEQ takes over site Operation and Maintenance. The scheduled turn-over of activities is December 2012.

The ODEQ has taken the lead for the Imperial Site's first Five-Year Review. The purpose of the five-year review is to review and evaluate the remedy to determine protectiveness. The site inspection was held on June 15, 2012 along with initial interviews. The review will be completed by February 2013 and placed in the repository for public review.

Benefits

During remedial action, a total of approximately 104,493.5 yd^3 of waste/soil and approximately 1699.5 yd^3 of sediment were removed from the Site and shipped to an offsite landfill. In addition, for those areas where waste remains in place, a clay barrier was constructed to mitigate migration and exposure. These areas will require long-term monitoring, five year reviews, and institutional controls to ensure protectiveness.

Reuse: The site is approximately 72 acres. Future site reuse is restricted to industrial.

Environmental Indicators: No ground water contamination was identified for this site, and human health exposure has been controlled with the removal of contamination and the construction of a clay barrier during the remedial action.

National Priorities List

Proposal Date: May 11, 2000
Final Date: July 27, 2000

Location: The site is located on Highway 142, Ardmore, Carter County, Oklahoma.

Population: An estimated 130 residents live within 200 feet of the facility and an estimated 23,427 individuals who live within four miles of the facility. There is no school or daycare center located within 200 feet of the facility.

Setting: Imperial Refining is an inactive and abandoned crude oil refining facility that operated from 1917 until 1934 when it declared bankruptcy.

Photos: During and After

Principal Pollutants: The waste piles were found across the site and were characterized as dry, asphalt-like tar mats associated with oil-contaminated soil on top of oil-stained clay. During the removal assessment, the volume for all waste was estimated to be between 15,000 and 17,000 cubic yards. Analytical results from all assessments found BTEX (benzene, toluene, ethlybenzene, and xylene), PAHs (polynuclear aromatic hydrocarbons), O&G (oil and grease), and metals.

Based on the Human health and ecological risk assessments, the contaminants of concern were PAHs (polynuclear aromatic hydrocarbons) and metals, primarily Benzo(a)pyrene and arsenic.

Human Health and Ecological Risk Assessment

The potential existed for elevated health/ecological risks associated with PAHs (polynuclear aromatic hydrocarbons) and metals. The media of concern included soils, sediments, and waste areas.

Principal Threat Waste: All visible areas of waste and the underground storage tank (UST), including Waste Areas A through L and drainage 1.

Site Soils and Drainage Sediments: Areas where contaminant levels exceeded residential and/or industrial cancer risk levels.

Pond and Creek Sediments: Sediments in the East and West Ponds and Sand Creek with contaminant levels exceeding a residential cancer risk and exceeding an ecological risk for sediment dwelling organisms.

Community Involvement

EPA released the Record of Decision Amendment Proposed Plan to the public for review and comment on November 3. The comment period began on November 3, 2008, and ended on December 3, 2008. During this time, EPA and ODEQ held a public meeting on November 18, 2008, in Ardmore, Oklahoma to discuss this document.

Record of Decision

The Record of Decision (ROD) was signed on December 26, 2008.

The major component of the remedy involves excavation and offsite disposal of soil, sediment and waste material. The soil, sediment, and waste material are not expected to exceed the Toxicity Characteristic Leaching Procedure (TCLP) based on waste material TCLP data results, and therefore, is not expected to be a characteristic hazardous waste under 40 CFR § 261.24. Prior to disposal, confirmation TCLP sampling will be conducted on the soil, sediment, and waste material. Based on the results, the material will be disposed offsite in an appropriately permitted and regulated landfill. No long-term monitoring, Site inspections, operation and maintenance, institutional controls, or five year reviews will be required due to the removal of contamination from the Site.

a. Soil: Approximately 16,438 yd3 of soil exceeding the cleanup levels for arsenic (20 mg/kg) and/or benzo(a)pyrene (1.55 mg/kg) will be excavated, analyzed for TCLP, and disposed offsite. Confirmation soil sampling will be conducted in each area of excavation to ensure cleanup levels have been met and all contaminated soil has been removed. These areas will then be regraded for proper drainage followed

by seeding.

b. Pond Sediment: Activity will include draining the ponds and treating the water onsite to meet applicable discharge limits prior to discharge to Sand Creek in accordance with the Clean Water Act, 33 U.S.C §§ 1251 *et seq*., 40 CFR Part 131 and 122, and Oklahoma Water Quality Standards OAC 785:45. Approximately 1,445 yd3 of contaminated sediments with a low benthic invertebrate survival rate and/or exceeding the cleanup levels for arsenic (20 mg/kg) and/or benzo(a)pyrene (0.782 mg/kg) will be excavated. Sediment will be analyzed for TCLP, and disposed offsite appropriately. Once the contaminated sediments are removed, confirmation sediment sampling will be conducted in each area of excavation to ensure cleanup levels have been met and all contaminated sediment has been removed. The ponds will be regraded and left open to accumulate water naturally.

c. Sand Creek Sediment: Approximately 188 yd3 of contaminated sediments exceeding the cleanup levels for arsenic (20 mg/kg) and/or benzo(a)pyrene (0.782 mg/kg) will be excavated. Sediment will be analyzed for TCLP, and disposed offsite appropriately. Once the contaminated sediments are removed, confirmation sediment sampling will be conducted in each area of excavation to ensure cleanup levels are met and all contaminated sediment has been removed.

d. Waste Material: Approximately 13,083 yd3 of visibly identified waste will be excavated, analyzed for TCLP, and disposed offsite appropriately. Underlying soil will be sampled to ensure soil cleanup levels have been met and all contaminated soil has been removed. These areas will then be regraded for proper drainage followed by seeding. This includes removal of the UST, its contents, and surrounding contaminated soil.

Record of Decision Amendment

The Record of Decision (ROD) Amendment was signed on February 20, 2009

The EPA began onsite RA construction February 13, 2008. As excavation of the waste material began and continued into the following weeks, it became clear that the vertical and horizontal extents were understated, and the original volume estimate was low. Although, the expectation was to exceed the original volume and cost estimates, attempts were made to meet the residential cleanup levels. As excavation activities progressed, waste was found to exist in locations where removal would be both impracticable and dangerous. Due to the increase in horizontal and vertical extent, the increase in volume, and the locations where waste will be left in-place, aspects of the original remedy were reevaluated.

The 2007 ROD identified Excavation and Offsite Disposal as the remedy for soil, sediment and waste. This component remains unchanged and was implemented to the extent practicable. In total, approximately 104,493.5 yd^3 of waste/soil and approximately 1699.5 yd^3 of sediment were removed from the Site and shipped to an offsite landfill. The following component is included to address those areas where waste remains.

12. Containment: This alternative includes the placement of a clay barrier over waste material that remains in-place. This alternative will achieve all RAOs by preventing exposure and mitigating migration through engineering controls, institutional controls, and monitoring during O&M and five year reviews. The materials left in-place are identified as non-hazardous waste and all TCLP data indicate that the leaching potential of this material is low as all results have been below regulatory limits for characteristic hazardous waste categories and land disposal restrictions. The backfill material is identified as a clayey sand and is expected to have a low hydraulic conductivity (within the range of 10-3 centimeters per second to 10-5 centimeters per second) which limits water infiltration and further reduces the potential for leaching (Shaw 2008b). As such, backfill of the excavated areas and areas above the waste material

eliminates the potential for direct contact, ingestion, and migration as well as provides for slope control, drainage control, and the establishment of vegetation. Although not a cap, this barrier meets the minimum requirements for and objectives of a Resource Conservations and Recovery Act Subtitle D landfill cap.

Because the contaminants will remain in-place, this remedy will be compliant with the Oklahoma Solid Waste Management Act. The Site will be restricted to industrial use through the use of institutional controls, available for limited reuse in areas where the waste remains in-place, will require O&M, and will require five year reviews.

a. Clay Barrier:

i. Ponds: Due to the presence of uncontaminated overburden, the complete removal of surface sediment exceeding the ecological cleanup numbers, and the unknown locations of waste at depth throughout the remaining areas of the ponds, no further excavation will occur. Excavated areas were backfilled with clean material and an institutional control (IC) will be placed on the ponds. O&M activities will be conducted by ODEQ and five year reviews will be conducted by EPA.

ii. Northern Site Boundary with Atlas Roofing, Inc.: An engineering evaluation identified suitable slope stabilization and construction activities and an appropriate backfill material for placement on the waste (Shaw 2008b). As backfill material was imported, a slope of no greater than 3 feet vertical to 1 foot horizontal was maintained along this border to minimize erosion and facilitate slope support, drainage control, and re-vegetation. Atlas Roofing, Inc. will place an IC on the Atlas Roofing, Inc. property. O&M activities will be conducted by ODEQ in coordination with Atlas Roofing, Inc. and five year reviews will be conducted by EPA.

iii. Site Boundaries with Hwy 142: An engineering evaluation identified suitable slope stabilization and construction activities and backfill material for placement on the waste (Shaw 2008b). As backfill material was imported, a slope of no greater than 3 feet vertical to 1 foot horizontal was maintained along this border to minimize erosion and facilitate slope support, drainage control, and re-vegetation. The Oklahoma Department of Transportation will place an IC on Hwy 142 and its associated utility easements. O&M activities will be conducted by ODEQ in coordination with the Oklahoma Department of Transportation, and five year reviews will be conducted by EPA.

iv. Northern and Western Boundaries with Valero Refinery property: Backfill of the excavated areas and areas above the waste material provides for slope control, drainage control, and establishment of vegetation. As backfill was placed, the drainage along this boundary was re-directed away from these waste areas in an effort to mitigate erosion, ensure drainage control, and facilitate re-vegetation. At this time, Valero is working with the ODEQ to develop plans related to the waste that remains on their property. O&M activities will be conducted by ODEQ, and five year reviews will be conducted by EPA.

v. Oneok Gas Pipeline: As backfill material was imported, a gentle slope was maintained along this border to minimize erosion and facilitate slope support, drainage control, and re-vegetation. The clay backfill was placed on either side of the pipeline and clay overburden, at a depth of approximately two feet, was placed along the top of the gas line to provide a barrier for the pipeline and promote surface water runoff. ODEQ will place an IC on the easement and conduct O&M activities in coordination with Oneok. Five year reviews will be conducted by EPA.

vi. Site Boundary with BNSF Railway: Backfill of the excavated areas and areas above the waste material provides for slope control, drainage control, and establishment of vegetation. BNSF will place an IC on the railroad right-of-way. O&M activities will be

conducted by ODEQ in coordination with BNSF, and five year reviews will be conducted by EPA to ensure protectiveness.

b. Operations and Maintenance: Because waste will remain in-place and the Site will be restricted to industrial use, O&M activities will be conducted by ODEQ no less often than once per year and will be required to ensure remedy protectiveness. O&M activities will include Site inspections for erosion, property uses, and enforcement of the ICs. This activity may also include maintenance of the slopes through grading, seeding, or importing of backfill that may be needed. Maintenance of these slopes will provide continued slope support, continued drainage control, continued vegetation growth, and ensure that exposure and migration is not occurring. Areas of primary interest will include the slopes along Hwy 142, Atlas Roofing Inc., Oneok Gas Pipeline, BNSF Railway, and Valero Refining.

c. Institutional Controls: Because waste remains in-place and the Site will be restricted to industrial use, institutional controls will be required. The purpose of this IC is to inform the general public of the restrictions and circumstances of the Site so that the risk of exposure is minimized. In accordance with Oklahoma Statutes, 27A § 2-7-123 (B), the ODEQ has the authority to file a *Notice of Remediation or Related Action Taken Pursuant to the Federal Comprehensive Environmental Response, Compensation and Liability Act* (Appendix A, template example). This notice will identify the reason for notice, the affected property, the remedy activities conducted on the Site, the engineering controls used on the Site, continuing operation, maintenance and monitoring activities that will be conducted, and the land use restrictions. This notice will also describe the proper management and disposal of the material should construction activity within these areas be required. This notice will run with the land and no change of ownership will change the land use restrictions. Any changes to these restrictions will be proposed to ODEQ for review and if approved, ODEQ may remove or alter the notice and land use restrictions. During O&M activities, these ICs will be reviewed to ensure that the restrictions remain in-place and that any Site activities adhere to these restrictions. The expected timeframe for filing the ICs is approximately 3 months.

d. Five Year Reviews: Because this remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a five year review will be required for this remedial action no less often than every five years and will be conducted by EPA in coordination with ODEQ. The purpose of the five year review is to evaluate the Site remedy for continued protectiveness. A Site inspection will be conducted to provide information about Site status and to visually confirm and document the conditions of the remedy, the Site, and the surrounding area. Observations will be made for any evidence of erosion and potential contaminant migration, property uses, trespass and vandalism and any corrective measures that were taken during operations and maintenance. As Site condition and data warrant, sediment sampling may be conducted once every five years in order to evaluate the continued protectiveness of the sediment overburden in the ponds. Data and other pertinent Site specific information will be reviewed to determine whether maintenance procedures, as implemented, will maintain the effectiveness of response actions. This will include review of sampling and monitoring plans, results from monitoring activities, O&M reports, and previous five year reviews.

In addition to Site-specific information, the original assumptions regarding current and future land/groundwater uses and contaminants of concern will be reviewed to make sure that these are still valid. Along with this, physical features and the understanding of physical Site conditions will be reviewed for any changes that may effect changes in standards and assumptions that were used at the time of remedy selection. The five year review will also evaluate any changes in the promulgated standards or "to be considered" standards as well as risk parameters that may impact the protectiveness of the remedy.

Comparisons of the Differences between the 2007 ROD and 2009 ROD Amendment			
Component	2007 ROD	2009 ROD Amendment	Difference

Soil Cleanup Levels	Residential: 20 mg/kg arsenic 1.55 mg/kg benzo(a)pyrene	Industrial: 20 mg/kg arsenic 5.27 mg/kg benzo(a)pyrene	Residential Scenario verses Industrial Scenario
Soil and Waste Volume	29,521 yd^3	104,493.5 yd^3	74,972.5 yd^3 increase
Waste Left In-place	All waste removed	Waste Remains In-place	Waste Remains In-place
Institutional Controls	No ICs	ICs included	No cost Difference
O&M (present value cost estimated for 30 year time period)	No Cost	$119,532.57	$119,532.57 increase
Five Year Reviews (present value cost estimated for 30 year time period)	No Cost	$59,598.90	$59,598.90 increase
Remedial Cost	$4,390,141	$6,565,000	$2,174,859 increase

Site Contacts

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